

A (mostly) kitchen friendly synthesis of 2c-b

Part 1: Synthesis of 2,5-DMNS (2,5-dimethoxynitrostyrene) from 2,5-DMB (2,5-dimethoxybenzaldehyde), scale of 230g / 1.4 mol+ (The Pretty Bit, Henry Reaction)

Chem info:

1 mol 2,5-DMB: 166.17 g/mol

1 mol 2,5-DMNS: 209.19 g/mol

1 mol nitromethane: 61.04 g/mol, density: 1.1371 g/cm³

1 mol ethylenediamine: 60.1 g/mol, density: 0.90 g/cm³

1 mol acetic acid: 60.052 g/mol, density of liquid form: 1.049 g/cm³

Density of isopropyl alcohol: 0.786 g/cm³, boiling point: 82.6 °C

Density of methanol: 0.792 g/cm³, boiling point: 64.7 °C

1. Weigh out 232.348 g (1.398 mol) 2,5-DMB and place into a 4 L beaker with a 7x amount in mL from grams of 2,5-DMB of isopropyl alcohol (IPA). 1626 mL still does not dissolve the 2,5-DMB so I add about 226 mL more (So actually use an ~8x amount). I use the cheapest IPA I could find. A 99% industrial grade one. You will need lots of IPA during the synthesis so grab 10 L+.
2. Prepare a 1.05 mol. eq. of nitromethane (NM) or 1.468 mol or 89.6g or 78.8 mL of NM and a 10% mol. eq. of ethylenediamine (ed) or 0.1398 mol or 8.402g or 9.335 mL of ed. Could be that I use less, as a drop or two of the ed spilled. Maybe 9.1 – 9.2 mL. Mix together in an appropriate container. Note that a mixture of NM with 5% ed is a high explosive, but I believe that you need a strong shock to detonate it, handling either NM or ed gave me no trouble, but ed does fume.
3. Prepare a 0.9 mol eq. of glacial acetic acid (pure) (GAA) or 1.2582 mol or 75.557g or 72 mL. I am not certain of the exact amount of GAA to use. With the GAA you will create ethylenediammonium diacetate (EDDA) *in situ* or in the reaction mixture. EDDA is 1 mol of ed to 2 mol of GAA so we would need a minimum of 0.2796 mol of GAA. This is a great excess, so in theory one might be able to use less. Maybe with this excess, you could help dissolve the 2,5-DMB if yet undissolved.
4. Pour in the NM + ed mixture under stirring and light heating, a slight colour change should appear. A stronger yellow from the very pale yellow of dissolved 2,5-DMB.
5. Pour in the GAA and the mixture starts to turn orange quickly. Heat to 30 °C under medium stirring.
6. I let it spin for 1 hour with heating up to ~55°C. I am not sure how much to heat, it seems that little is needed. I would certainly not heat above 65. Maybe even 30 is all that is needed.
7. Watch the colour change. When the colour was a darker orange, started changing to a red-orange even a burgundy red this is when I remove from heat and put it aside to return to room temp.
8. Crystals may or may not appear spontaneously. Watch closely, when they start appearing it is a wondrous sight! I would let it sit for a few hours and wait and see, maybe even set it in the fridge. Could be that crystals will appear only after a few hours. If you are impatient like me, you could dip in a glass rod into the reaction mixture, wait for the IPA to evaporate and you should have crystals stuck to the rod. Now dip the rod back in, and twirl it around, this should act as a seed crystal, and

you should see crystals appear in the beaker. But I would wait for them to form on their own. I believe not rushing will create needles, which might lead to a cleaner product.

9. The beaker should be a mass of orange crystals. You need to clean, dry, and preferably preform a recrystallization on the formed 2,5-DMNS. But first I stuck the beaker into the freezer, maybe some more will fall out under cooling...

10. Next day I decide to wash the crop of 2,5-DMNS with a 40% sodium bisulfite solution first, then dH₂O, then IPA on a bÜchner funnel under vacuum. The sodium bisulfite should create an adduct (addition product) with unreacted benzaldehyde. If unreacted benzaldehyde was in solution in the reaction mixture, the adduct should create a crystal mass insoluble in the reaction mixture. This does in fact occur, or appears to do so, and some white particulate fall to the bottom of the vacuum flask.

Next I clean with lots of cold water and then maybe IPA. This is a large amount so you might need to run the vacuum for some time. You will need a larger Büchner funnel, maybe even a 4000 mL+ one with a 2.5 L+ vacuum flask. Collect 479.1 g of a still wet orange fluffy monstrosity. Should have run under vacuum longer.

11. In all literature, it is written that a recrystallization of the 2,5-DMNS must be done, but next time I will not bother with this step. Dissolving such a large amount was impossible. I did not have enough methanol (MeOH) on hand, and it seems that one would need to use even more IPA. I did try to dissolve in a boiling IPA/MeOH mixture but had no luck. Consider skipping the recrystallization when dealing with these 200g+ amounts or have lots of MeOH on hand. At a minimum of 15 mL/g. 1.398 mol of 2,5-DMNS is 292g, take a 90% yield so I would first attempt a recrystallization with 3.95 L boiling MeOH. You could begin with 13 mL/g but in IPA such an amount will not fully dissolve the nitrostyrene.

So I settle for a semi-re-crystallization. Partially dissolved mass, this also should help clean the product.

Dry under vacuum again, then fully dry under a fan. Yield is 225.764 g (1.079 mol) of ok-ish 2,5-DMNS that should be good enough to use in the next part. I think a 77.2% yield of the cleaned 2,5-DMNS is fair. Maybe some tweaks could be made, maybe you need to react longer, but this part is a success in my books. It is an easy reaction, you could do even larger amounts easily, and 2,5-DMB is not expensive. About 1g 2,5-DMB in, 1g 2,5-DMNS out, good enough.

One could try to react with 2-hydroxyethylammonium acetate (2-HEAA) which I used to prepare 3,4,5-TMNS. But I go with ethylenediamine for 2,5-DMB and ethanolamine for 3,4,5-TMB.

You could take a break at this point and store the 2,5-DMNS for a later date. It could be that 2,5-DMNS degrades so I would store it in a fridge, maybe even a freezer, and try to use it eventually. And as well, one can always react portions of the nitrostyrene in the next step.

IMPORTANT NOTE: 2,5-DMNS is some sort of irritant, and unless you want to be sneezing and with a

runny nose all the time, feeling like you are sick, wear a mask AND gloves around it, even with smaller amounts. Seems that other nitrostyrenes as well cause this reaction, but with 2,5-DMNS is seems more severe. IT IS IRRITATING. This compound could be used as a common cold producing agent to mimic an illness but without the fever...

Link with more info about EDDA: <https://www.erowid.org/archive/rhodium/chemistry/edda.html>

Link with info about 2-HEAA: <https://www.thevespiary.org/talk/index.php?topic=17911.50>

Part 2: A larger scale NaBH₄/ CuCl₂ reduction of 2,5-DMNS to 2,5-dimethoxyphenethylamine (2c-h) freebase and conversion to the oxalate salt. 200g/ 1 mol+ scale. (The Reaction, The Difficult Bit).

Chem info:

1 mol 2,5-DMNS: 209.19 g/mol

1 mol 2c-h freebase: 181.232 g/mol, pKa: 9.6

1 mol 2c-h oxalate: 271.266 g/mol?

1 mol sodium borohydride (NaBH₄): 37.83 g/mol

1 mol copper (II) chloride dihydrate (CuCl₂): 170.48 g/mol

1 mol oxalic acid dihydrate: 126.065 g/mol

!FOLLOW THE UPDATE FROM HERE STARTING ON PAGE 13!

Preface: I suggest you try to do this part of the synthesis over one day. It might take a long time but you will have a stable salt form instead of an unfinished reaction sitting overnight, possibly discoloured in the morning.

1. For this reduction I used a 6 L three-neck flask, but in hindsight a 10 L one would have been better. One could react 300g in a 10 L flask. This time I went with the classic route but used a dH₂O to IPA ratio of 1 to 1.5 instead of 1:2. There is a comment on thevespiary.org that even 1:1 is used for 2,5-DMNS. It can be a bit tricky to figure the correct quantity as the sodium borohydride needs to dissolve in water, but you want to use as little as possible to fit in your vessel, AND you have to take into account lots of potential evaporation during the reaction if you go with an open container.

Evaporation is a problem when the reaction really gets going, and I would suggest a properly working system and a controlled reflux with a water cooled condenser. For this run nothing was really working well, and the reaction did not go to plan, but still an ok yield was obtained. Of note as well is that the IPA really boils after addition of copper chloride, and the scent of rubbing alcohol can get very strong.

2. I used a 7.5x mol. eq. of NaBH₄ as per literature. This amounts to 306.188g. Although folks like to toy with this ratio as well. For example even here:
<https://chemistry.mdma.ch/index/nabh4.copper.reduction.html>. (A 7.7 mol. eq. is used). I do not know which is best and whether to use all at once. I left out some for before the addition of copper. Could be that one might be able to use much less NaBH₄ with another methodology, like

the silica gel one.

End up using 280 g at first, and the rest I leave out. Decide to dissolve the NaBH₄ in 1.1 L of dH₂O + 1.65 L IPA (1:1.5). A total of 2.75 L or 12.18 mL/g to the 2,5-DMNS (225.764 g 2,5-DMNS we will react). Turns out this was not enough water in the end. Borate salts ended up crashing out post-reaction. Experiment with different amounts. Maybe try a 15 mL/g amount of dH₂O+IPA.

My reasoning was to use as little as possible but still get the NaBH₄ to dissolve. I forgot to take into account evaporation. <https://www.chemister.ru/Databases/Chemdatabase/search-en.php> has solubility info. It is written there that NaBH₄ is soluble in:

*water: 25 (0°C) water: 55 (25°C) water: 88.5 (60°C), water: reaction (100°C)
at g/100 g of solvent.*

We will start at close to freezing and end up with close to 80°C, so take this data into account. We need to look now at the 25g/ 100 mL amount. At boiling, the sodium borohydride decomposes, aka it is “quenched”.

3. Before dropping the NaBH₄ in the reaction vessel make sure to grind it up finely. It picks up water from the air and clumps together, so also make sure to keep it sealed from moisture if you can.
4. At this time prepare the CuCl₂ as well. I used a 13% mol. eq. this time. Other sources write to use a 15% mol. eq. but I used less as I was scared of using so much. Could be that only a 10% amount is needed.
So 0.14027 mol or 23.913 g (this is of the dihydrate) dissolved in a minimum amount of 1:1.5 H₂O:IPA. I ended up using about 47 mL H₂O and 62.5 mL IPA to fully dissolve the copper metal into a dark green solution. Literature writes that it is 1150 g/ L soluble in water, that would require about 21 mL, but I ended up using much more. Maybe you will have luck dissolving in less. It is important to dissolve the copper chloride in a minimum amount of solvent as we shall soon see.
NOTE: Do not use a metal spoon to scoop up the copper chloride, use glass if you can. Will react, corrode it.
5. At this time you should have a lot of ice on hand as we will need to chill the reaction rather well. Have maybe 3 or 5 kg of ice. Just prepare everything now. I would suggest to work in a giant plastic tub in case of spills or to lay some plastic on the ground as shit is about to get wild!
6. Place your flask in a large bucket with plenty of crushed ice-salt-and cold water. Wait for the temperature to fall to maybe 4°C. Have extra ice on hand to add as the reaction proceeds. I used a glass dish that barely fit the 6 L flask, was too small. Just submerge in a bucket.
7. Now that 280g of the NaBH₄ has dissolved in the water + IPA, start adding in the 2,5-DMNS through a glass funnel on one of the necks of the flask, the other neck should have a thermometer, and the central one, with a manual stirrer that works well, and most importantly sealed well with an adapter that works. (was not the case for me, did not seal properly).
8. Add in about 5 spoonfuls of 2,5-DMNS at a time. During the first addition watch carefully that things do not boil over too much. Hydrogen gas really begins to be released, and the temperature rises as well. At this point I believe the orange nitrostyrene is reduced to 2,5-dimethoxynitroethane. Watch the thermometer so that nothing rises above 25°C. But maybe if it hits 30 °C it is not that big of a deal. Frequent changes of ice and cool water.

And also, what I forgot as well is to watch for the colour to disappear before every addition. Was impatient, should have had better cooling so did not wait for colour to go away. Milky white is what we are looking for.

Now a lot of hydrogen gas evolves during this reaction. I am not exactly certain of the dangers here, but just make sure you have no ignition sources around. I believe that a very specific concentration of hydrogen gas is needed to become dangerously flammable.

I was working with a faulty open system in a small flat, all the hydrogen and fumes were trapped in my apartment, but nothing exploded although in the next step sparks were formed.

9. The addition of 2,5-DMNS took 2 hours, with lots of foaming present. Yellow colour did not fully go away. Could be because I did not wait for colour to disappear with each portion.
10. Add the remaining NaBH_4 and spin a few more minutes.
11. Next comes the second step of the reaction, hydrogenation catalyzed by CuCl_2 . It is a very reactive step, but many sources stress the importance of the addition of the copper in one go. To do this, and to avoid a volcano, you need to transfer your mixture into a large container with straight walls. The three-neck flask's shape is such that it propels everything out through the necks when a large amount of gas is produced. Things spew everywhere. So pour into a 10 L or even better 20 L beaker. I suppose one could just use a bucket at this step. Set up you overhead stirring. Cover as much as you can with something but leave a hole to pour in the dissolved copper. Maybe some cardboard or foil. Now make sure you are not wearing fancy clothing and have googles on. The copper will ruin your clothes.

Say a prayer and pour directly into the vortex!

A big ass mushroom cloud of hydrogen is produced with an audible woosh.

Yeehaa now we cookin'!

The large beaker should have contained everything, but notice how far up the walls the copper travelled. You really need a container at least 4 times larger than the mixture. What happens as well is that the leading edge of the falling copper hits the IPA+water first, reacts, creates gas which propels the copper still to hit the surface away and out of the beaker. Small unreacted droplets are still a possibility. And to contain truly everything I would suggest working in a large tub.

The CuCl_2 is transformed instantly into the black elemental copper nanoparticles which act as the catalyst. It is some sort of complicated process that bombards your molecule with hydrogen. You could opt instead to work in a more sane manner, and pour the CuCl_2 at such a rate that it just reaches the top of the flask but does not boil over, with strong overhead stirring, and save yourself the work of pouring into another container. Yields may or may not suffer.

Set-up your 3-neck flask with a condenser piping cold water and prepare it for a reflux. Pour the reaction mixture back into the 3-neck flask and begin stirring with an overhead stirrer. Be careful and watch what is going on, the stirring itself is enough to drive the reaction. And it could be that no heat is required. Apply only a small amount of heat when you are sure things are under control. Watch so that the reaction mixture does not go above 80°C, maybe 75. Literature states to reflux at 80°C for 30 minutes. But that is for gram amounts.

I was not able to set up my condenser or anything properly, tubing slipped off the aquarium pump. and had no heating as at one point the reaction boiled over and fried my mantle. There was even an electrical fire as the copper and IPA short-circuited my mantle. But it did not set off the hydrogen alight.

So I made do with violent stirring for an hour and a half, no heating, IPA boiling off into the room. A controlled reflux of 1 drop every two seconds is the proper way as I understand.

At some point you will see the reaction calm down and come to an end. Maybe only an hour of reflux is needed. And I suggest to not be as foolish as I was and to not do this scale without proper ventilation, or to do it outside.

10. Let the reaction cool a bit, but not all the way to room temp. Could do it even hot. You need to filter before borate salts crash out, so work quickly. I filter twice under vacuum with 180 mm medium speed qualitative filter paper. There is some difficulty filtering but the vacuum manages.

11. As everything cools, loads of shiny borate crystals appear, remember the solubility chart. I decide not to try to extract anything out of the bottom water layer as it is mostly crystal. Have difficulty in dealing with the borates. They would clog a separatory funnel. More water was needed in the reaction, but now it is too late. It would be best after filtering the copper to wait for the mixture to cool to room temp. and then simply decant the top IPA layer, use multiple beakers, more borates might appear, then maybe filtration is an option when little solids are left.

End up with about 1 L of a cloudy light-yellow IPA layer.

12. Now we need to dry this layer (rid it of water). Have a saturated solution of potassium carbonate on hand. To prepare the potassium carbonate brine I used about 500 to 600 g K₂CO₃ to water (you can decant if there is some undissolved K₂CO₃). Slightly more K₂CO₃ than water, a lot of potassium carbonate. In a 2 L separatory funnel wash twice with 200 mL of the brine. One might need a 5 L sep. funnel if starting with 300g+ amounts of 2,5-DMNS.

13. Wash with an excess of magnesium sulfate. The conc. K₂CO₃ wash should pick up most of the water, the magnesium sulfate will pick up what is left. K₂CO₃ might somehow help quench any NaBH₄.

14. Gravity filter over a large sized medium filter paper folded into a lovely flute.

15. Before we can rest yet, let's convert the freebase 2c-h dissolved in the IPA into a salt form. There are a few options here. You could try to make 2c-h hemisulfate. In that case, prepare a 10% solution of

H_2SO_4 from pure 98% H_2SO_4 you distilled out of drain cleaner, and calculate for half the molar amount from a very liberal 80% yield from the 2,5-DMNS.

Again, you need to make the hemisulfate so only half the amount is needed (2 molecules of 2c-h attached to 1 H_2SO_4). Drop in carefully and watch for the pH to hit 6.6. (will explain why later). Pump off the IPA under vacuum.

One could also use a dry HCl gas rig. Or use IPA saturated with HCl. Hell, you could even drop in aq. HCl now, but boy would you get a mess when evaporating off first the IPA, and then the water. A green slime. But it is an option as well, the most basic route. You will might have a lot of slime product. Would need to clean that very thoroughly though.

That is what we are trying to avoid by making the oxalate or sulfate, any messy HCl. By changing salts, we will leave behind impurities. I have yet to try making the sulfate salt, but it might be superior to other forms. I believe it was Benignum on Science Madness who was advocating sulfate for many amines not just mescaline, so maybe try to make the sulfate.

But I end up using another popular route and make the oxalate salt. Again, calculate for a 80% yield, but use an excess. A 1.05x excess for some reason I chose. Anyway, end up using 0.90636 mol. of oxalic acid dihydrate. Dissolve to 20% in IPA or 114 g in 570 mL.

16. I heat up the oxalic acid/ IPA mixture to allow the oxalic acid to dissolve better. The beautiful clear golden IPA in the other beaker is really waiting for me now...

The IPA with the 2c-h freebase is at a 11.2 pH to begin with, I drop in the oxalic acid under magnetic stirring until a pH of 5.6 is reached. Use only half of the oxalic acid, so maybe the yield was less than 50%?

17. At some point everything will turn into this wheat paste. And it could be that a pH of 5.6 was too low. As beyond 6, addition loosened up the mixture, seemed to make it slightly more watery. Oxalic acid has difficulty dissolving whether in IPA or water.

Note on target pH:

From the Purification of Laboratory Chemicals (6th Edition):

The advantage of using pK values (instead of K values) is that theory (and practice) states that the pK values of ionisable substances are numerically equal to the pH of the solution at which the concentrations of ionised and neutral species are equal. For example acetic acid has a pK_{2.5} value of 4.76 at 25°C in H₂O; then at pH 4.76 the aqueous solution contains equal amounts of acetic acid [AcOH] and acetate anion [AcO⁻], i.e. [AcOH]/[AcO⁻] of 50/50. At pH 5.76 (pK + 1) the solution contains [AcOH]/[AcO⁻] of 10/90, at pH 6.76 (pK + 2) the solution contains [AcOH]/[AcO⁻] of 1/99 etc; conversely at pH 3.76 (pK - 1) the solution contains [AcOH]/[AcO⁻] of 90/10, and at pH 2.76 (pK - 2) the solution contains [AcOH]/[AcO⁻] of 99/1.

One can readily appreciate the usefulness of pK value in purification procedures, e.g. as when purifying acetic acid. If acetic acid is placed in aqueous solution and the pH adjusted to 7.76 {[AcOH]/[AcO⁻] with a ratio of 0.1/99.9}, and extracted with say diethyl ether, neutral impurities will be extracted into diethyl ether leaving almost all the acetic acid in the form of AcO⁻ in the aqueous solution. If then the pH of the solution is adjusted to 1.67 where the acid is almost all in the form AcOH, almost all of it will be extracted into diethyl ether.

So if we use a target pH that is 3 lower than the substance's pKa, almost all will form as the salt. And you wouldn't over-acidify. The pKa of 2c-h is given as 9.6 found somewhere online. So a target pH of at least 7.6, probably 6.6 is optimal. Maybe I am wrong about this, please correct me.

Had to add some additional IPA to loosen up the sludge, and then I filter over vacuum. The weight of an almost dry 2c-h oxalate is 148.357 g. So 0.547 mol of 2c-h oxalate or a 50.7% yield of a very lightly yellow crème powder. Once completely dry and milled the oxalate is dusty and light, tends to fly everywhere. That is another disadvantage of the oxalate, it is rather dusty.

Conclusion: The idea behind the oxalate is to avoid the 2c-h sludge or dirty 2c-h HCl. The oxalate should leave behind many impurities, and should come out relatively clean. Also you can avoid working with 2c-h freebase directly for now. 2c-h freebase oil picks up CO₂ from the air very quickly and can solidify into 2c-h carbonate rather easily.

The yield was not the best, but I did have a spill where maybe 10% was lost, and I could not manage a proper reflux. Maybe 65%+ is possible, and there is a post written of 2 mol+ amounts with 75%+ yield, could be possible with more practice. Maybe an optimized NaBH₄/CuCl₂ path exists I do not know about.

Looking around, there is something about the NaBH₄ on silica gel that I might try next.
The info regarding P2NP reductions apply here, as well as info from here, and a 3,4,5-TMNS reaction.

But what I did notice, the difference between this and 3,4,5-TMNS with which I also have some practice, is that 2,5-DMNS is more reactive, more active cooling is needed to deal with those angry Trump's fluff. I wonder how P2NP goes, its appearance is closer to 3,4,5-TMNS...

This reaction does not exactly scale perfectly. If you are after making a 1kg of 2c-b maybe a few 20 L are needed at once? Reduced amounts of IPA+water and NaBH₄ would help as well. Here is where the silica gel or diatomaceous earth might help.

And I would look into catalytic hydrogenation if going for scale. BUT it seems that the catalysts needed have gotten to be prohibitively expensive. I just started reading up on this so can't say for certain how large amounts of 2c-b get made.

A link to the classic beaker TEK, where one would pick up from after the NaBH₄ addition:
<https://www.erowid.org/archive/rhodium/chemistry/2cb.beaker.html>

Link to silica gel advancements info:

<https://www.thevespiary.org/talk/index.php?topic=20862.msg54225705#msg54225705>

Well anyway, we should have a decent amount of 2c-h sulfate or oxalate at this point, ready for the next step. But first let's get some rest. The 2c-h oxalate can be stored for a long time.

Part 3: Conversion and cleaning of salts. 2c-h oxalate to 2c-h HCl.

1 L of 36% hydrochloric acid contains: 11.64 mol of HCl

Density of dichloromethane (DCM): 1.3266 g/cm³, boiling point: 39.6 °C

Up to this point, notwithstanding the cooked mantle, everything had gone rather well. From here it could have been fatigue, but mistakes were made and yield dropped off numerous times. I would suggest to not go about this route and pick another one. Pointless work that kills yield.

At this point, there are a variety of options, one could try to brominate the 2c-h oxalate with N-Bromosuccinimide (NBS), but I would clean it first with ethyl acetate. There are some posts here and there about this on thevespiary. I for one have not tried it out, one would need to use a lot of GAA to dissolve the oxalate, and it might need to spin for a long time before anything occurs. Could be possible though. Might try that sometime.

One could as well at this point freebase the oxalate and pick it up with DCM, then attempt to brominate in DCM with NBS.

I went with a salt conversion, a conservative route that has given poor yields in the past, and gave a poor yield this time, so again, unless you have a better technique than I do, avoid this conversion, and avoid the oxalate for fuck's sake.

Anyway here is how it went:

1. Dissolve 148g (0.547 mol) of 2c-h oxalate in 8x amount of water or 1.2 dH₂O. Heat and mix with magnetic stirring. Once dissolved the pH is 4.420, we are aiming to basify to 12.6 (about +3 from pKa)
2. Carefully prepare a 500 mL sol. of 20% KOH (not NaOH it seems).
3. With careful addition of KOH a pH of 12.6 is reached, the freebase is floating around, but a sticky yellow slime appears as well. I decant the floaters and get rid of them, believe them to be impurities from the reaction. Transfer to a 2 L sep. funnel. Have 1.6 L of liquid. Will extract the freebase with 350, then 200, then 150 mL of DCM. Or so is the plan. Am left with a combined 780 mL of a yellowish DCM – 2c-h freebase mix. Now I will evaporate off the DCM, but distilling off is a better bet. DCM vapour is not the most fun to stick around. But my mantle is fried...
4. Now prepare a dilute sol. of HCl. Calculate the amount for 0.547 mol, so need a max 47 mL of 36% HCl. Dilute this to 250 mL.
5. Set the DCM to evaporate off on a pyrex plate on a hotplate with a fan blowing. Maybe at 80 - 100°C. Initially the DCM goes off quickly, and when little is left you will notice 2c-h carbonate begin to form, do not worry, the HCl will beat it into submission soon. More and more carbonate appears, but you must evaporate off ALL the DCM. The last is difficult to get, the plate could be a white crystal before all of the DCM is gone. You can attempt a sniff test for DCM, but in hindsight this is downright foolish. I once used to love the stuff, oh look how clean everything comes out of it, look how heavy it is, tee-hee. But now am more wary of it, I reason it will be the unhealthiest compound to be around in the entirety of this synth, so try and limit contact with it. Wear a mask. I would try to use maybe diethyl ether next time, much more green, and should be easier to evaporate.
6. Once all DCM is gone, start pouring the aq. HCl onto the carbonate, pour maybe 1/3 of the total and swirl around the plate, mix well, then start adding smaller portions and monitoring the pH after each pour and mix. The HCl will melt the carbonate quickly. Use up ½ to ¾ of the total HCl to reach a pH of 6.5. If all DCM had been evaporated, no sludge will appear, if you had some DCM left over, it will appear as tiny droplets. Good luck getting rid of it now!
7. Once the proper pH has been reached (careful with HCl addition below 7 or 7.5, pH might drop rapidly with little addition), it is time to evaporate off the water. Heat the plate to 100 – 120°C with a fan

blowing, and the water should boil off slowly. End up with a mass of sticky crystals, they melt easily, but that is not water left. The crystals might not be fully solid. That's alright.

We have a yellowish colour, but not green bird shit.

8. Clean with ethyl acetate (EtOAc), I prefer to clean with cold EtOAc as I swear that cold acetone washes away product. So I use only EtOAc now. After the first wash over the pump, I remove, dry some, and mill everything in a coffee grinder. Return the mostly fine powder for a second wash to reach places where the first could not get at. Wash very thoroughly a second time. End up with a mostly clean and dry 2c-h HCl that weighs 73.547 g (0.3378 mol). A huge disappointment. A 61.8% yield for a simple A/B. Maybe I should have added more HCl, or maybe the DCM did not pick up all the freebase. Maybe the yellow slime was actually a part of the product. Did pumping and washing suck product as well?

Another option would have been to clean the initial 2c-h oxalate with ethyl acetate... Or just avoid this route altogether next time. And I am not the only one who has experienced major loss of product with this salt conversion...

Part 4: Bromination of 2c-h HCl with N-Bromosuccinimide (NBS) to yield 2c-b HCl and cleaning of crude 2c-b (The Final Stretch and a perfect product)

1 mol N-Bromosuccinimide (NBS): 177.985 g/mol

1 mol 2c-b freebase: 260.128 g/mol, pKa is 9.68

1 mol 2c-b HCl: 296.59 g/mol

Bromination with NBS is simple and quick. NBS is a bromine radical releasing agent. However, it seems fine to handle and I noticed no special precautions are needed. But still be careful around it.

For this synth I did try to recrystallize my yellowish NBS in boiling water and that actually created some problems.

The guideline is to use 10 mL dH₂O for 1g NBS. Your water has to boil for some time for the NBS to fully dissolve, then you let cool, and clean NBS crystals should drop out.

In practice I had difficulty dissolving 100g of NBS, and as the mixture reached boiling, what seemed like bromine gas started to become evolved, a strong scent appeared, and I put a halt to the experiment, did not perform a successful recrystallization once again, another partial recrystallization.

Later I found posts that write not to recrystallize the yellow NBS. The yellow colour is Br₂, and it should actually help in the reaction. Should boost yields and shorten reaction time. So maybe do not attempt a re-x on the NBS, it will only stink up your place when it heats up. Skip this step and go on using straight the yellow NBS.

But if you do go with a re-x you should end up with some very nice white NBS crystals that weigh 70 – 80 g from a starting 100 g.

1. For the bromination try a 1.2 mol. eq. of NBS from the 2c-h HCl. We have 0.3378 mol 2c-h, so need 0.40536 mol NBS or 72.14 g.

Note: Do not handle the NBS with metal as well, stains and ruins metal spoons.

2. Go with an 8x amount in mL of GAA from 2c-h. So we use 590 mL.

Note: If you are working in a cold environment your GAA might be frozen as crystals. Warm in a bain-marie bathe to melt your GAA, hence the name glacial...

3. Dissolve 73.547 g 2c-h in a 1 L beaker with the GAA and begin moderate magnetic stirring.
4. Drop in the NBS, mixture goes from a light yellow (2c-h was not fully pure) to a red quickly. The red is indicative of the presence of Br₂, then it goes to an orange as 2c-b is finally born, and crystals begin to fall out. Everything is over rather quickly. Might not even take 5 minutes for your beaker to become clogged in an orange paste, with stirring not possible. Full of precipitate. But it looks cool.

Was a larger portion of GAA needed? Next time maybe use a 9x amount of GAA?, maybe it would stir longer before choking up.

5. Not much else can be done at this point, so we move on to filtration and cleaning.
6. Suck at the pump but do not wash with anything, suck as dry as possible and collect the mother liquor, set it in the freezer, a bit more 2c-b should appear in time.
7. The 2c-b might be a pinkish or a light orange colour at this point, but we shall attempt to clean it as well as we can. Screw the yield, I am after the absolute purest 2c-b!

I want an ultra-pure, blindingly white 2c-b that would make Jesus cry. A 2c-b that would not even hurt a newborn's nostrils, weened on pH 8 milk.

The plan is to solve the enigma mankind has been pondering since the birth of time; how to make a 2c-b that does not hurt to insufflate. What is to blame for the pain 2c-b inflicts on the nose? I believe that it has to be free bromine, not the 2c-b molecule itself. What is the antidote to bromine and other halogens? What is used in accidents to neutralize bromine? Yes, 10% sodium thiosulfate solution!

My innovation is to wash the 2c-b with a 10% sodium thiosulfate solution. I mix up one from this cheap sodium thiosulfate pentahydrate, this stuff stinks like fertilizer, and it is a powder not crystals. So I believe I had an impure product. Best is to buy a stock solution, or get the highest quality sodium thiosulfate.

So I drop in a bit of sodium thiosulfate and at once the 2c-b goes white. I watch as a single drop spreads its white tentacles, destroying, binding the pesky Br₂. Oh my! Think what a thousand drops would do!

For me the 2c-b resembles Neapolitan ice cream, and I begin to imagine myself as an artisanal gelateriano on a search for Stracciatella with the perfect composition, and I do get carried away with my quest for the tastiest, and whitest vanilla-2c-b-gelato in creation. I pour too much solution while pumping, and I believe I wash a fair amount of 2c-b away. It might be wise to go by the dropful in a larger dish to whiten the 2c-b, and use the high quality sodium thiosulfate that should come in large crystals. Or one of those 1 M stock solutions.

But I did not stop there, the 2c-b at this point was the whitest I have yet seen, but still I wash two more times with cold ethyl acetate for good measure under pumping and mixing with a spoon. With the ethyl acetate I could also have washed some product away. But I collect everything nonetheless and stick the second mother liquor in the freezer as well.

Next time, would use a smaller amount of sodium thiosulfate, and let it soak, then carefully pump. Still need to figure this part out pat.

8. Leave to fully dry in a crystallizing dish under a fan. Collect from the original crop 26.473 g, then I take what is out of the freezer, and collect that but first pump under vacuum and dry.

The first mother liquor I only freeze for a bit as the GAA freezes solid, so thaw it first.

This second batch is dirtier and has a stronger fertilizer smell, weighs 24.295 g. Total weight is 50.768 g or a 50.6% yield from the 2c-h HCl. Another poor yield.

However the colour of the 2c-b is a grayish white, maybe even a light hint of green, does not look perfect. Could be that there is residual sodium sulfate, or some sort of sulfates there. Maybe even succinimide? It is a lot of 2c-b for sure, and it looks ok, I am very tired of the synthesis at this point as I have been working without a break, but a nagging feeling lingers as I call it a day...

9. Next day I decide to drag out some of the gear once more and try a re-crystallization of the 2c-b at least to rid it of the smell. Snooping around, read that people have trouble with this step. But our beloved Benignum had success with a dual solvent system with acetonitrile (AcN) and methanol (MeOH) to dissolve 2c-b. Ahh, I do have some AcN around and still a fair amount of IPA, but no MeOH, but why not try with more IPA, it might work.

Nope, I first use 724 mL AcN and 275 mL IPA to dry to dissolve the 50.768 g 2c-b when boiling, have no luck. Already this is about 20 mL/g. Add 260, 180, and another 200 mL IPA, solution is boiling but it is cloudy, on the bottom there is a bunch of undissolved 2c-b. Yet another failed recrystallization! Don't think I did anything with this attempt, but the AcN+IPA mix has turned a light yellow. Maybe I did trap some impurities, and when I pump and dry under vacuum, the 2c-b does indeed look a bit better. A nicer white colour, dry fully and the smell almost all gone! So the semi-recrystallization, the mixing in AcN+IPA did help some I think.

Weigh, and another damn disappointment, another major loss, have in the end about 36g of white 2c-b. I will settle for this one, grind with a coffee grinder into a truly nice powder. Job finally done.

The yield on the NBS bromination is not the best as well. Is it better to pick another method when dealing with larger amounts? But NBS is so easy to use. You could make 2c-c by using N-Chlorosuccinimide (NCS) instead. But would N-Iodosuccinimide (NIS) work to make the superior 2c-i? NCS is very easy to prepare if not found, but there are sources for it, and NIS as well. A useful synth would be to replace nitromethane with nitroethane and to make 1-(2,5-dimethoxyphenyl)-2-nitropropene (2,5-DMP2NP) from the 2,5-DMB. Then reduce 2,5-DMP2NP to 2,5-dimethoxyamphetamine (2,5-DMA). Use that to make DOC with NCS.

Conclusion: I snort a small amount of 2c-b and the burn is still there, but it is minimal. Another time I snort a few large lines, burn is very real, but not the strong pain I used to experience. So it could be that uncleaned bromine only caused a portion of the pain, and the 2c-b molecule itself is responsible as well...

But my nose is not destroyed at all the next day, this really is better 2c-b. Whether to include the sodium thiosulfate wash is an open question, and a successful recrystallization would be helpful as well. Happy tripping.

Fin

An Update (Version 2.0)

A few improvements have been made, and yields are higher:

First an update to the **NaBH₄/ CuCl₂ reduction**. Scale is about 100 g, but this should work well even at 200 g+ in a 10 L 3-neck flask:

- 1)** Will use about **13 x of liquid** to the 2,5-Dimethoxynitrostyrene amount. Start with **91.5 g or 0.437 mol.** of once recrystallized **nitrostyrene**, they are those distinctive orange hairs, but not entirely pure. A mixed bag.
- 2)** Plan to use a total of **7.5 mol. eq. of NaBH₄** or 3.278 mol or about **120g NaBH₄** in total. But **100 g to dissolve now** and 20 g to leave out before addition of CuCl₂.
- 3)** Into a 6 L 3-neck flask pour **550 mL dH₂O and 700 mL IPA**. The proportion is not 1:1 water, IPA. But it is much more water, the borohydride still dissolves, and we end up working with a more convenient smaller IPA layer than the usual 2:1.
- 4)** It is better to cool everything before adding the NaBH₄. Use a bucket with **salt-ice-water cooling** or even a large glass dish. Ice water cooling is entirely sufficient at this scale.
- 5)** Add 100 g of finely crushed NaBH₄, as the vessel had not cooled sufficiently it starts reacting with the water. Eventually I cool it down to about 8° C and only then begin addition of the nitrostyrene with overhead stirring at 220 RPM.
- 6)** In intervals between 3 to 5 spoonful additions prepare a **0.2 mol. eq. of CuCl₂·2H₂O** or 0.0874 mol or **14.9 g**. This is a much much larger amount than the usual 0.1 mol eq. Why not use more? Dissolve in a minimum amount of 50% IPA. Or about **30 mL IPA + 30 mL dH₂O**. The copper chloride dissolves better in water than in IPA.
- 7)** **Addition** of the nitrostyrene takes about **1 hour**. Temperature does not rise above **18° C**. There is foaming present, but large additions of ice, and overhead stirring work well to keep everything in check. The orange hairs disappear, left with a mostly white milky layer. Pour in an additional 50 mL IPA used for cleaning the sides of the flask.
- 8)** Out of the 20 g additional NaBH₄ add a total of 18 g and leave it to spin at room temp, for an additional 50 min having removed the cooling bathe.
- 9)** Set the flask on a heating mantle.
- 10)** Use a 20 mL pipette to draw up the CuCl₂ and squirt deep into the vortex almost in the liquid layer. A long and large 50 mL or 100 mL glass pipette would be even better. The pipette works wonders, helps to reach deep into the vessel and you can totally control the reaction this way.

The reaction is still violent, lots of smoke is produced that wooshes out of the open neck. So wear a

glove on the pipetting hand. Just make sure the reaction is energetic as can be without spilling over. The pipette lets you control everything and if you pipette out as close to the surface of the liquid as possible near the vortex, splashes are also reduced this way.

Maybe with two quick squeezes pour in the CuCl₂. Nothing is spilled, the heating mantle is not destroyed. As well as there is a lot of flammable H₂ produced at this point, make sure no sources of sparks or flames are in the vicinity of outlets.

11) Place a large condenser on one of the necks, a 600 mm Allihn with cold water flowing. Turn on the heat to maybe 140° C. The IPA really starts to boil, and the condenser can't deal with all of it, but it helps a great deal. Most of the IPA condenses and falls back, it really boils at a quick rate initially. If done correctly not that much IPA boils off.

If going for a larger scale, a 200 g reaction, I would use 2 Allihn condensers of an equal size.

Stirring speed is increased at this point, to about 350 RPM, but watch the temperature closely, and make sure nothing boils over.

12) Once the initial thrashing and violent boiling settles down, temps have stabilized, reflux at a **max of 78° C for 45 min**. About 3 drops/ second at reflux.

13) Remove from heat, you can stop stirring, and let the reaction **cool** down a bit to about **50° C**. Pour your reaction layer into a more convenient beaker and filter the copper floating on the bottom of the upper (IPA) layer. Filter twice over a large Büchner funnel with medium filter paper. A small amount of black copper particles remain, it is not a big deal.

14) Now pour the still warm reaction mixture into a 2 L sep. funnel. The bottom, water layer goes into one beaker, the top, IPA layer goes into another beaker. Have about 900 mL of the IPA layer which is cloudy. But most importantly the colour is only a light yellow. It is not golden, it is not brown it is not black. Cloudy with a light yellow. Looks very good.

15) Most of the goods are in the IPA but I go for max effort and with fresh IPA extract twice from the aqueous layer. 100 mL and 50 mL IPA. The aq. layer has a bunch of dissolved borates. But if we do all of the work in the sep. funnel and filter while everything is warm borates shouldn't crash out.

16) Now have a combined amount of about **1100 mL of the IPA**. Discard the aq. layer.

17) Wash + dry in a sep. funnel 2x with **K₂CO₃ brine**. Wash volume is about 20% of the IPA layer. Combine 120 g K₂CO₃ with 110 mL dH₂O for 220 mL of the brine.

18) Wash + dry with 15 g **MgSO₄** but I believe this is too much layer was mostly dry. Still the layer after the MgSO₄ was cloudy.

19) Gravity filter over medium speed filter paper folded into a flute directly into a 2 L one neck flask. Now the layer goes crystal clear, and has a light colour. (Shame I didn't take a picture). Its pH is 11.2.

20) Distill off most of the IPA under vacuum. Do not have a good vac source so goes slowly. Distills at 36 - 38 ° C. Stop distillation as it is taking too long, have about 200 mL of the IPA layer left. Now other options should be explored for getting the 2C-H. I have tried making the sulfate and that seems to work,

but that was from a dirty IPA layer. So can not tell just how well. The acetate of 2C-H might precipitate directly from the IPA layer as well.

If one has a very good vacuum source you can dry distilling off the IPA, and then vacuum distilling off the amine.

21) I go for **HCl** this time, the safe way, no oxalate fuckery. Calculate the HCl amount. If a starting amount of 0.437 mol. estimate for roughly 80% or 0.35 mol or **30 mL of 36% conc. HCl**. Dilute this to 100 mL, but this is too much, can **dilute to 60 mL** as well. Transfer the IPA to a pyrex plate.

22) Separate a portion of the IPA in case of over-acidification. Start pouring in the HCl and use all, actually use just a bit extra. Could indicate that the yield is more than 80%. Final **pH is 6.6**.

23) Evaporate off the remaining IPA with mild heating, continue evaporating off the water until a thick paste is formed. Leave to fan dry.

24) Wash the dirty yellow - orange 2C-H HCl with cold ethyl acetate in a Büchner funnel mixing well, filter. The EtOAc seems to help carry off remaining water. Leave to fan dry. The yield of 2C-H HCl from the reaction mixture is **76.432 g**. Mol. wt. of 2c-h HCl is 217.693 g so I have **0.351 mol** or a yield of **80% from the nitrostyrene**. A very very good initial yield of some fair looking 2C-H, but it still needs to be cleaned further.

25) Will perform an A/B extract. Basify with KOH (can use NaOH as well). Use a bit of a mol. extra so use 0.368 mol KOH or **20.68 g** dissolved in **100 mL dH₂O**.

26) Mix the 2C-H with 700 mL dH₂O in a 2 L beaker with magnetic stirring. It does not fully dissolve, but that is ok, when we basify it will dissolve. Add the hydroxide until a pH of 11.5. Now have 800 mL of the aq. Layer with the freebase floating around.

27) Pick up the 2C-H freebase with DCM in a 2 L sep. funnel. Extract 3 x using 150 mL, 100 mL, and 50 mL DCM.

28) Now I believe I made a mistake here and could have tried adding conc. HCl. directly to the DCM with strong mixing. Then attempt to pick that 2C-H HCl with water? Or at least tried. If I end up with not much 2C-H product, can just evaporate the DCM.

Another option might be to add GAA (AcOH) to make 2C-H acetate. That will form from the DCM directly.

The problem with the HCl is that it is aq. And that in theory doesn't mix well with DCM.

29) Decide to evaporate off the DCM in a pyrex dish on a hotplate with mild heating (in a fume hood). When most of the DCM is gone the 2C-H freebase will start converting to the carbonate salt from contact with air. Not a problem.

30) Once again prepare **30 mL of conc. HCl** that I dilute a bit to 50 mL. Leave a portion of the watery carbonate layer out in case of an overshoot. Add the HCl until a good pH (mid 6s).

31) Evaporate most of the water and clean with cold EtOAC, suck with a vacuum, also clean with

acetone but that seems to carry off product away (just like with 2C-B). Makes for a whiter product however.

32) After the A/B extract I have a final **61.423 g 2C-H HCl**, so a yield on the A/B of 80%, or 65% from the initial nitrostyrene. Could have been borates in the crude 2C-H, or maybe I still don't know how to do a proper A/B or the acetone carried product away.

Final stuff looks pretty good. Not totally white but this crème colour. Fine powder with some chunks. Good enough to make 2C-C, 2C-I, or 2C-B.

Some key take-aways:

- Can use less than 13x of liquid, maybe even go less to 10x combined IPA + water (eg. try a reaction with 200 g nitrostyrene and 2000 mL combined IPA + water in a 10 L 3 neck flask.)
- Can use less than a 7.5 x eq of NaBH₄.
- The large pipette helps so much in controlling the copper reaction, way safer than pouring directly into the neck.
- Effective cooling with 2x large Allihn condensers helps prevent loss of IPA (can use less liquid without borates crashing out).
- After addition of copper make sure to not heat your mantle too much. Keep temp. at or a bit below 78 ° C. If it heats up too much the whole IPA layer will darken and yields possibly reduced.
- Filter and separate layers while everything is still warm.
- Ideal scenario would be effectively vacuum distilling off the IPA then increasing heat and vacuum distilling the 2C-H freebase.
- Salting with HCl works well also no need for oxalate, just takes a bit more work.

As well an idea that I would try in the future and another option is preparing anhydrous HCl in IPA and salting the reaction IPA layer directly. Then 2C-H HCl should fall out of the IPA, saving the need for evaporation or distillation.

Sorry but took no pictures this around. Key thing to look for is the colour of the IPA layer post reaction, if it is cloudy and a light yellow but not a dark yellow then it is good.

Improvement on NBS Bromination

Re-did the entire experiment using a more traditional approach, and had both a high yielding run from the nitrostyrene to 2C-H (previous post), and **2C-H HCl bromination with NBS**. Decided to play it safe, and it sort of payed off.

From 2C-H HCl that was A/B'ed from 2C-H HCl (previous post), but not completely clean:

1) To a 1 L beaker set on a hotplate with magnetic stirring add **55.28 g 2C-H HCl (0.254 mol)**. Will use a **1.2 x mol. eq. of NBS** or 0.305 mol or 54.23 g. Decide to use slightly less, **54.094 g**. NBS was not recrystallized, was old and had colour.

2) Dissolve the 2C-H HCl in about **10x of GAA (ACoH)** or **550 mL**. Slow to dissolve, but made sure to get almost all of the 2C-H to dissolve.

3) Add the NBS, but I add in portions, maybe a 1/4 - 1/3 at a time, stir a bit until most of the NBS is dissolved, and then add more. Colour changes quickly, before the last addition of NBS the colour is a darker red. Make sure that all of the NBS or succinimide is dissolved before 2c-b starts forming.

4) Heat to 40 - 50 °C. The 2c-b precipitates out fairly quickly, but with the slightly larger proportion of GAA, it should not seize up, spinning is free. Continue spinning under mild heat for an hour.

5) Filter on a Büchner funnel. With the vacuum turned off in the Büchi, mix thoroughly with cold EtOAc. Wash a few times. Set aside the mother liquor.

6) Reset the vacuum flask, and continue washing and filtering but now with a prepared **10% sodium thiosulfate** solution. This makes the 2C-B very white. Doesn't seem to dissolve the 2c-b either. At this point I should have washed with plain water, as the sodium thiosulfate leaves a smell. Had run out of both distilled water and EtOAc by now. Discard the aq. washes.

7) Let the mother liquor sit at room temperature, but I later transfer to a fridge overnight. Don't know if freezing helps to speed up 2C-B to precipitate.

8) Fan dry the first crop but the sodium thiosulfate smell lingers.

9) In the morning take the mother liquor from the fridge but it is frozen as it is mostly GAA, takes a long time to thaw so set on a hotplate to speed up the process. Can see that there is quite a lot of product that has fallen out. Maybe it is not all 2c-b but also some succinimide? Succinimide dissolves somewhat in water (23g succinimide/ 100g water (20°C)) but does it dissolve in GAA or EtOAc?

10) The second crop I wash with 10% sodium thiosulphate solution and acetone. Again, mixing thoroughly. Discard mother liquor.

From the **first crop** there is about **49.788 g**, from the **second** about: **13.78 g** (forgot the first crop weight in my excitement but the total is correct): **63.568 g** or **0.215 mol**. The mol. wt. of 2C-B HCl is 296.59 g/mol so this makes for a **84% yield**. The 2c-b might just be a bit damp, but the yield is fantastic. The second crop has this ghost whiteness, but the first is also very white.

As there is an anthill of 2C-B, I do not hesitate to carry out an **A/B extract** by way of the acetate salt. Dubbed "à la Shulgin" a few posts back.

1) Under magnetic stirring try and dissolve the 2C-B HCl in 800 mL dH₂O, but remember 2C-B HCl is rather insoluble in water, while 2C-B HBr and 2C-B Acetate are soluble. Doesn't dissolve.

2) Prepare a **20% NaOH** sol. Use a 1.05x excess. About 0.2247 mol or about **9 g NaOH in 55 mL** water.

3) Add more water to the 2c-b, suspend it in 1 L hochwasser.

4) Now with spinning add the NaOH and plain water to help the 2c-b HCl dissolve. At **ph 12.4 and 1450 mL wasser** most of the 2C-B HCl dissolves. Leave just a few stubborn bits. The 2C-B freebase is a **yellow-**

greenish oil on the bottom of the beaker.

- 5) Extract in a 2 L sep. funnel with **DCM**. Use 250 mL, 150 mL, 50 mL. Run out of DCM as well.
- 6) Treat the combined DCM with a **1.2 mol eq. of GAA**. 14.124 g or about **13.8 mL**. First the cloudy DCM layer goes totally clear, then the **2c-b acetate** precipitates out. Add a bit more GAA as pH is not falling (but then again no water in layer, so made a mistake here, no more GAA was needed).
- 7) Now I made a **mistake** here. Believe it would have been better to just filter the 2c-b acetate and separate from the DCM with possibly some impurities. So it would have been first the water, then the DCM that would leave behind impurities.
- 8) Instead on a pyrex plate evaporate off the DCM with fan drying, and eventually from the green sludge some very nice sparkly crystals appear. Whitish light yellow-green.
- 9) When the crystals are mostly dry add dH₂O directly to the plate. Carefully add just enough dH₂O to dissolve the crystals. Use maybe about **250 mL**.
- 10) Pour **conc. HCl** directly into the plate. Calculate for a **1.05 mol. eq.** or 0.2247 mol. HCl or **19.3 mL**. Very dramatically large columns of 2c-b HCl form as the acid hits the water. Toss and turn the plate around but the HCl salt forms instantaneously. pH drops to 1.2 or something like that, so it was too much HCl.
- 11) Wash this 2C-B HCl first with dH₂O and then with acetone (still didn't have EtOAc) and I really believe the acetone could have carried away some product.
- 12) Fan dry, and end up with only **35.7 g** of a light crème coloured 2C-B. This 2C-B is not pure white, but slightly off-white. However it does seem purer. Maybe if I had removed the DCM and washed better with a larger amount of EtOAc would have gotten a white product.

The product looks very good, actually better than the white stuff as it is all a fluffy homogenous mass after milling. Rather similar to Benignum's anhydrous 2C-B HCl. So maybe this is the actual colour of pure 2C-B?

Something killed the yield however. Did the basic water carry off a large portions? The water was murky indeed. Was it succinimide in the water?

However, these are the positive points to remember for NBS bromination:

- Use a larger GAA amount to aid with stirring, 10x or 11x the 2C-H HCl amount. Not 8x.
- Don't need a 1.2 mol. eq. of NBS. Think 1.05 - 1.1 is enough.
- Maybe mild heating and some time spinning helps with the yield.
- Could be adding the NBS in portions and waiting for it to dissolve helps as well?
- Recover the second crop by pouring in (and washing with) EtOAc.

So now it should be totally within reason to make something like 100 g of the final product from 200 g 2,5-Dimethoxybenzaldehyde. Have a good time with this one.